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CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

REPORT
FALL 1996

Conservation Here at Home: Studying the Coast Horned Lizard

With all the effort that CRES scientists are devoting to helping conserve endangered species globally, it is sometimes easy to forget that there are other, less conspicuous species right here at home that need and deserve our attention. One of these is the San Diego coast horned lizard. Although San Diego coast horned lizards frequent a variety of habitats, within these areas they have very specialized requirements, including open areas for basking, bushes for cover, fine loose soil for burrowing, and the presence of harvester ants for food. One community in which they typically occur, coastal sage scrub, is now restricted to only 10 percent of its former area because of rapid urbanization.

As a result of development, pesticide use, collecting for the pet trade, and off-road vehicle activity, San Diego coast horned lizards are becoming ever rarer throughout their range. Because relatively little is known of the biology of these charismatic little lizards, basic information on their habitat and resource requirements, as well as their behavior, reproductive physiology, and genetics, is critical to developing effective management plans for their survival. And that is where the CRES comparative physiology division comes in.

In the spring of 1995, CRES researchers Allison Alberts, Tandora Grant, Lori Jackintell, and Jeff Lemm undertook a three-year field project near Temecula to study the San Diego coast horned lizard, in collaboration with Lester Milroy of the Horned Lizard Conservation Society. We

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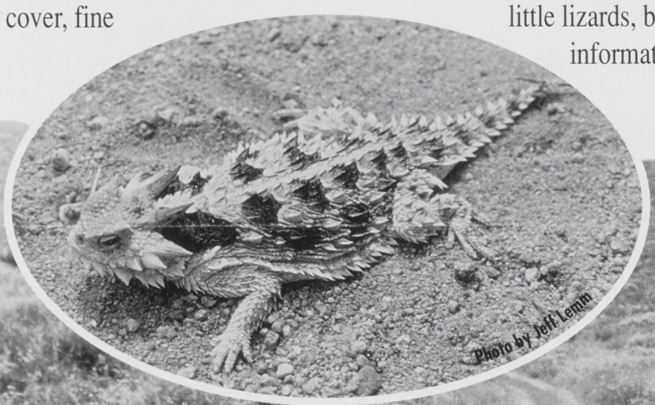


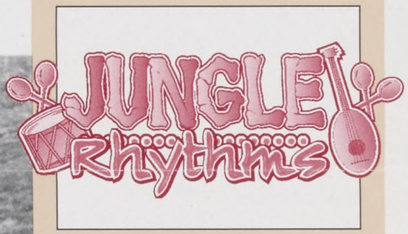
Photo by Jeff Lemm

San Diego coast horned lizards—once so common throughout southern California and now a local endangered species—have caught the attention of CRES scientists. This is the comparative physiology team at work near Temecula, California.

CRES® is operated by the Zoological Society of San Diego.

Conservation Dinner
An evening with the Conservation Medalists. See page 4.

Bonner and NSF Summer Interns
An opportunity to help make a difference. See page 5.



1996 Celebration for the Critters
Jungle Rhythms will beat at the Zoo! See back cover.

Studying the Coast Horned Lizard

Continued from page 1

were particularly interested in the factors affecting the abundance and distribution of coast horned lizards in the environment. To determine this, we have been tracking individual lizards over time to learn more about how they use the available habitat. By using tiny radio transmitters strapped on by means of miniature backpacks, we have been able to follow the movements of individual horned lizards for several months at a time.

Coast horned lizards utilize a surprising variety of different habitat types, ranging from grassland to scrub, and can move up to a kilometer or more in just a few days, a remarkable feat for such a small animal. Some of the most important plants in terms of providing adequate protective cover include buckwheat, black sage, and California sagebrush.

Whenever a horned lizard is encountered, we take several measurements, permanently mark the animal with a minute implanted transponder chip, and collect a small blood sample from the tail for hormone analysis. In order to document the yearly reproductive cycle, blood from males is analyzed for testosterone content and blood from females for estrogen content. A thorough understanding of the reproductive cycle of coast horned lizards allows us to predict the times of year during which these lizards are most sensitive to disturbance. In addition, early identification of abnormal cycling patterns can be extremely important in identifying areas where additional hands-on management may be necessary.

A second use for the blood samples we collect will be to carry out a genetic characterization of the coast horned lizard population at our study site, in collaboration with Tracey Brown of the University of California at Los Angeles. Results of these studies will provide an estimate of the genetic variability of our study population and how it is related to other southern California populations of this subspecies. Assessing the genetic distinctiveness of our study animals and determining links to nearby populations will be critical to identifying appropriate source populations for possible future reintroduction programs.

CRES scientists make measurements of a San Diego coast horned lizard to study growth rates in the wild.

1996 "Wish List" for Comparative Physiology

Power Macintosh 7500 computer, $2,500. For analysis of coast horned lizard field data.

CRES researcher Jeff Lemm measures a buckweat plant, an important resource for the San Diego coast horned lizard.

Another area of our research focuses on how the eggs and embryos of coast horned lizards, as well as the hatchlings they produce, are affected by the temperature and humidity experienced during incubation. Using eggs from a captive colony of horned lizards, we are experimentally testing the influence of three different temperature and three different humidity conditions on the growth and survival of horned lizard hatchlings. The information we gain on how environmental conditions affect the well-being of horned lizard hatchlings will allow us to evaluate the suitability of different habitats for nesting purposes, and it could help guide future management decisions such as the placing of roads and trails. We are very grateful to the Bayer Corporation, whose recent donation of three American Scientific Products incubators has made these studies possible.

Finally, we are investigating the types of ants that coast horned lizards need in order to survive. By observing horned lizards as they forage at ant colonies and examining their scat under a microscope, we can identify the quantity and type of ants typically consumed. When combined with surveys of ant populations on different parts of the reserve, this information allows us to identify those areas best able to support healthy populations of coast horned lizards over the long term.

Since we began our project over a year ago, we have often heard our fellow San Diegans comment on how the coast horned lizard literally used to live right in our own backyards. While those days are probably gone forever, it is our hope that, with adequate habitat preservation and careful management based on sound science, these unique and attractive lizards can continue to survive alongside San Diegans for generations to come.

—Allison Alberts, Ph.D.
Head, Comparative Physiology Division/CRES

So You Want to be a Philanthropist?

If your answer is affirmative and you are a seasoned 50 years of age or better, you might check out the Zoological Society's Pooled Income Fund.

It is a wonderful way to arrange a significant future gift to CRES and the Zoological Society while producing lifetime income payments, tax advantages (if you itemize), and prestigious major donor status for yourself. And it is as easy as opening a bank account. You may contribute cash, immediately marketable securities, or, perhaps, real estate. Your contribution is irrevocably committed to an investment grade corporate bond fund from which you receive quarterly earnings checks for the rest of your life. Then, your Fund units pass to the Society as a charitable gift (the basis for the potential tax advantages). Highly appreciated but low-yielding securities can be converted to Fund units without capital gains tax liability, and—if you itemize—you may take a charitable gift income tax deduction (federal and state under present law) for a portion of every contribution to the Fund.

There is a $5,000 minimum to open an account. If you contribute $10,000 or more, you are granted an appropriate level of prestigious lifetime donor "Circle" status, with special guest privileges, public recognition as a major donor, and many other perquisites. To receive an informative brochure, please telephone Patrick O'Reiley, the Society's planned giving director, at (619) 685-3215.

CRES Products Now Available in Japan

As CRES' reputation expands internationally, the opportunity for merchandising products in other countries under the CRES name is also growing.

Photo by Amy Parrott

Now Japanese consumers can even buy CRES T-shirts and apparel that feature endangered species and promote conservation of the environment. In Japan, CRES jewelry, accessories, children's clothing, and neckties are also available. They are offered for sale at Jusco, one of Japan's largest retailers.

With more than 200 stores throughout Japan, Jusco is committed to environmental causes. The T-shirts are made available at Jusco through a licensing agreement with Toray Diplomode, a Japanese firm. The parent company, Toray Industries, has also become a CRES Conservator.

Both Jusco and Toray are supporting CRES because of their corporate awareness of the need to save endangered species. They are working with CRES to support the education of the Japanese consumer through products that feature the CRES name and its conservation activities. A percentage of all sales are donated directly to CRES.

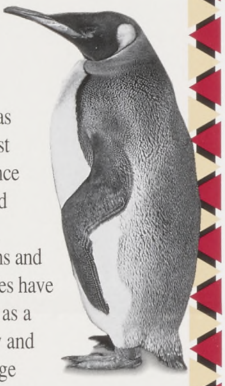
CRES Grants

The Center for Reproduction of Endangered Species is grateful to the following for their support of imperiled wildlife:

The L.J. Skaggs and Mary C. Skaggs Foundation *has made a grant in support of Dr. Barbara Durrant's work in conservation of endangered carnivores. The grant will be used for the purchase of supplies for germ plasm cryopreservation, for the purpose of preserving potential genetic contributions to captive wild populations.*

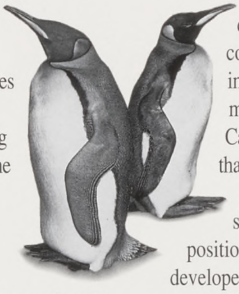
An **Anonymous** *donor has made a grant in support of the CRES behavior division at the Wild Animal Park.*

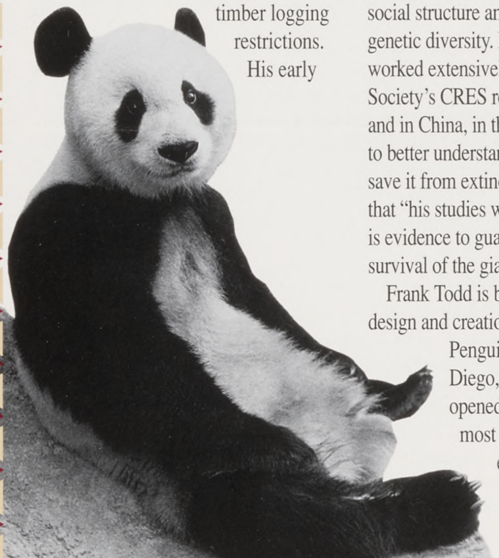
DINNER WITH THE 1996 CONSERVATION MEDALISTS



Each year the Zoological Society of San Diego recognizes one or more individuals for substantial contributions to conservation through their research, fieldwork, or education efforts. This year, the Society has selected two distinguished scientists to receive the 1996 Conservation Medal: Professor Pan Wenshi and Frank Todd.

Professor Pan Wenshi is Dean of the Environmental Biology and Bio-Ecology Department at Beijing University. Captivated with giant pandas since he was a child, he has specialized in research with giant pandas over the past 13 years. During his years of research, Professor Pan has come to recognize the importance of preserving the panda's native habitat and has served an active role in accomplishing that, primarily through encouragement of timber logging restrictions. His early studies focused on a potential correlation between a drastic decrease in some bamboo crops—a main staple of the panda's diet—and the dwindling giant panda population. Worried about the lack of sufficient food sources, the Chinese considered removing all giant pandas from the wild and placing them in managed reserves. Giant pandas remain in the wild today in part due to Professor Pan's research, which refuted the common thinking and found sufficient quantities of bamboo to support the wild population. His studies further showed the importance of leaving the giant pandas in the wild, in order to preserve the wild population's natural social structure and genetic diversity. Professor Pan has worked extensively with the Zoological Society's CRES researchers, both here and in China, in their concerted efforts to better understand the giant panda and save it from extinction. He has stated that "his studies will not stop until there is evidence to guarantee the continued survival of the giant panda."





Frank Todd is best known for the design and creation of Sea World's Penguin Encounter in San Diego, which—when it opened in 1983—was the most sophisticated animal exhibit of its time. Fifteen years of field research in Antarctica, which was initiated at the request of the National Science Foundation, preceded the exhibit opening. Hundreds of penguins and many different species have been captively bred as a result of this facility and the related knowledge developed over the years. Frank Todd began his career at the Los Angeles Zoo, where he developed the Zoo's avian collection into the third largest in the country. He raised and managed the only captive California condor in the world at that time. Frank Todd joined Sea World of California in 1972, serving in various curatorial positions. During his tenure, he developed Sea World's waterfowl collection into one of the largest and most comprehensive in the world, and he fostered the most productive captive-breeding flock of Caribbean flamingos. Author of various books and publications on waterfowl, Frank Todd is considered an expert in the fields of aviculture, conservation, tropical biology, and field biology. Currently, he serves as executive director of EcoCepts International, which specializes in conceptual design of naturalistic ecosystem exhibits.

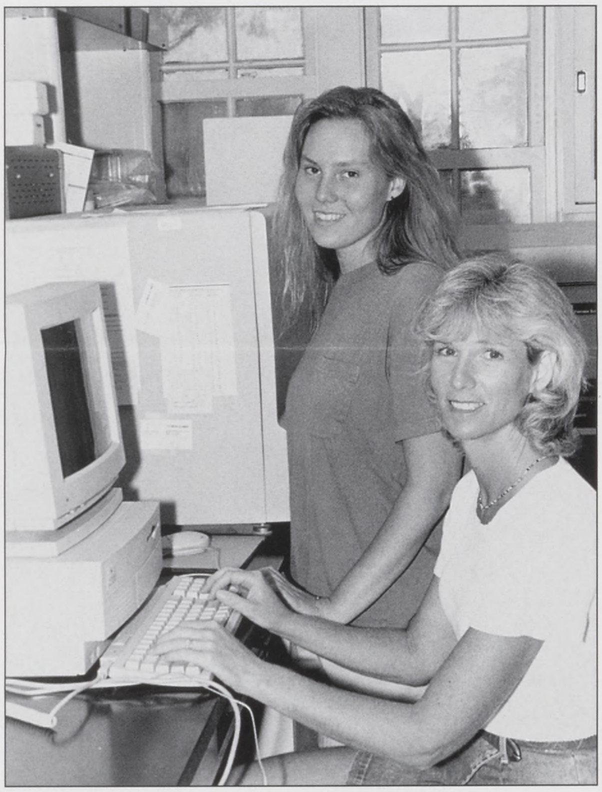
The 1996 Conservation Medal recipients will be honored at a dinner on Friday, October 4, 1996, at the Sheraton Harbor Island Resort. For ticket information, please call (619) 557-3974.

1996 Bonner Fellows and NSF Summer Interns Participate in CRES Projects

The Bonner Summer College Student Fellowship Endowment Fund at CRES, established in 1994 by Jewell H. and James T. Bonner, enables young researchers to work on projects that can improve the health and well-being of vanishing wildlife species. By sponsoring a summer intern, you can join the Bonners and help CRES in its research efforts. For more information, please call Amy Parrott in the San Diego Zoo's Development Office at (619) 685-3213.

Jennifer McNeill, a sophomore at the University of Arizona, has her sights set on a degree in conservation genetics. Having volunteered with the CRES genetics division during the summer of 1995, Jennie applied for the 1996 Bonner Summer Fellowship in order to gain more hands-on laboratory experience. Her project for the summer involves chromosomal identification of the European wild boars at the San Diego Zoo. A chromosomal polymorphism (i.e., difference) is known to exist between different populations of this species. In order to appropriately match pairs for breeding, it is important to identify the genetic differences in the captive population. Working with the staff from curatorial and veterinary services, samples from the Zoo's 14 animals will be collected for evaluation. Jennie's project requires techniques in blood and cell culture, cryopreservation of somatic cells, chromosomal banding, photomicroscopy, and karyology. In addition, Jennie will begin comparing the European wild boar karyotypes (chromosomal profile) with that of other suid species, such as warthogs, babirusas, and bearded pigs, in order to help us understand chromosomal evolution in the family Suidae.

Matamata turtles and European wild boars are this summer's CRES projects for Bonner Fellows Ellen Macdonald (standing) and Jennifer McNeill (seated).



The National Science Foundation (NSF) also sponsors summer interns at CRES. Daun Clizbe (seated), from California State University at San Marcos, is working on genetic markers for the critically endangered northern white rhino. Hillary Sheipe, from Swarthmore College, Philadelphia, is involved with an immunocytochemical investigation of germ cell migration in alligators.

The 1996 Bonner Summer Research Fellow for the Society's pathology department is Ellen Macdonald, who will be entering her third year of veterinary school at Colorado State University this fall. Not only is Ellen a Bonner Fellow, she also received an award from the American College of Veterinary Pathologists for her internship at the Zoological Society of San Diego. This is an honor for CRES as well as for Ellen, because we were competing with other pathology departments in veterinary schools, diagnostic and medical research laboratories, and industry offering summer pathology experiences to veterinary students. Ellen's fascination with zoo and wild animal medicine, pathology, and research began when her parents brought her to the San Diego Zoo as a child. And she is no stranger to CRES, having spent six months with Nancy Czekala in the endocrinology division working on pygmy and slow lorises.

Ellen's summer project is an analysis of matamata turtle medical problems and mortality at three different institutions: the Zoological Society of San Diego, the National Zoo in Washington, D.C., and the Wildlife Conservation Society/Bronx Zoo in New York. She is working in collaboration with clinicians and pathologists at the three institutions, as well as with the reptile department at the San Diego Zoo and with the Zoological Society's nutritionist.

Matamata turtles are native to the Amazon and Orinoco river basins, where they spend much of their time lying on the bottoms of rivers and waiting for their prey. Nearly all the matamatas in zoos throughout the world are wild caught and captive breeding has been rare. With habitat destruction through deforestation and increasing human populations, it is not known how many matamatas exist in the wild. If captive breeding can improve, then the wild matamata population will not be exploited for the zoo and pet trades.

Critical to improving captive management is an understanding of diseases that occur. The focus of Ellen's research is to establish normal values for clinical physiologic parameters, to determine what health problems have been seen, and to determine what changes in husbandry should occur to improve captive management and breeding. In addition to her research project, Ellen is perfecting her techniques in postmortem examination and learning comparative anatomy, which will enable her to perform more effectively as a zoo animal health care professional.

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CRES REPORT
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

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SAN DIEGO ZOO · SAN DIEGO WILD ANIMAL PARK ·

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